

Helping you comply with RoHS

# NS<sup>e</sup>® LEAD FREE -SOLDER

LEAD FREE SOLDERING

## For Environmental Conservation



ecology of the  
earth  
environment  
economically in  
electrical &  
electronic products for  
eternity

Nihon Superior has been working to develop environmentally friendly lead-free solders and related materials and can now supply products that deliver high reliability. We also stand ready to work with customers in developing improved soldering materials and processes. Our objective is maximizing customer satisfaction by achieving the best possible quality and yield.



NIHON SUPERIOR

## Lead-Free Solder Alloys

| Alloy       | Product code          | Composition (mass%) |     |     |      |       |       | Melting point (°C) | Form |      |       |                 |     |
|-------------|-----------------------|---------------------|-----|-----|------|-------|-------|--------------------|------|------|-------|-----------------|-----|
|             |                       | Sn                  | Ag  | Cu  | Ni   | Ge    | Other |                    | Bar  | Wire | Paste | Flux cored wire | BGA |
| Sn-Cu-Ni    | SN100C <sup>1)</sup>  | R                   | —   | 0.7 | 0.05 | ≤0.01 | —     | 227                | ●    | ●    | ●     | ●               | ●   |
|             | SN100CL <sup>1)</sup> | R                   | —   | 0.7 | 0.05 | ≤0.01 | —     | 227                | ●    | ●    |       |                 |     |
|             | SN100C3               | R                   | —   | 3.0 | 0.05 | ≤0.01 | —     | 227-310            | ●    | ●    |       |                 |     |
|             | SN100C4               | R                   | —   | 4.0 | 0.05 | ≤0.01 | —     | 227-340            | ●    | ●    |       |                 |     |
| Sn-Ag-Cu    | SN96C <sup>2)</sup>   | R                   | 3.8 | 1.0 | —    | —     | —     | 217                | ●    | ●    | ●     | ●               | ●   |
|             | SN97C <sup>3)</sup>   | R                   | 3.0 | 0.5 | —    | —     | —     | 218-219            | ●    | ●    | ●     | ●               | ●   |
| Sn-Ag       | SN96                  | R                   | 3.5 | —   | —    | —     | —     | 221                | ●    | ●    | ●     | ●               | ●   |
| Sn-Bi       | BI57                  | R                   | —   | —   | —    | —     | 57Bi  | 139                | ●    |      | ●     |                 |     |
| Sn-Ag-Cu-Bi | LF-C2 <sup>3)</sup>   | R                   | 3.5 | 1.0 | —    | —     | 3.0Bi | 208-213            |      |      | ●     |                 |     |
| Sn-Sb       | 95A                   | R                   | —   | —   | —    | —     | 5.0Sb | 236-243            | ●    | ●    | ●     |                 |     |

1) The product has been patented in 23 countries and regions including Japan (JPN PAT.No.3152945) and United State (US PAT. No.6180055).

2) US PAT. No.6231691B1 3) US PAT.No.5527628

Please, contact us for other alloys and forms.

### Impurity Levels in SN100C The maximum allowable level of lead permitted by the RoHS Directive is 0.1mass%.

| Sb    | Pb    | Bi    | Ag    | Zn     | Fe    | Al     | As    | Cd     |
|-------|-------|-------|-------|--------|-------|--------|-------|--------|
| ≤0.05 | <0.05 | ≤0.03 | ≤0.05 | ≤0.002 | ≤0.02 | ≤0.002 | ≤0.03 | ≤0.002 |

Please, contact us for other alloys.

### Excellent Joint Reliability SN100C (Sn-0.7Cu-0.05Ni+Ge) Effect of the addition of Ni & Ge

- Less Shrinkage
- Reduced Copper Erosion
- High Cyclic Strain Performance
- Inhibition of IMC Growth
- Excellent Resistance to Thermal Fatigue

#### Less Shrinkage Note that the surface of SN100C is smooth and bright.

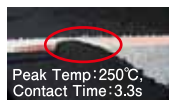
| Solidified Lead-Free Alloy | Sn-Cu Family | Sn-Ag-Cu Family |        |        | Sn-Cu-Ni Family |        |
|----------------------------|--------------|-----------------|--------|--------|-----------------|--------|
|                            | SC           | SAC0307         | SAC107 | SAC305 | SCNP            | SN100C |
| Whole Surface              |              |                 |        |        |                 |        |
| Shrinkage                  | YES          | YES             | YES    | YES    | YES             | NO     |
| Magnified Cross-Section    |              |                 |        |        |                 |        |

#### Reduced Copper Erosion

■ Erosion of Exposed Section of Copper Track



SN100C (Sn-0.7Cu-0.05Ni+Ge)



Sn-3.0Ag-0.5Cu

#### Inhibition of IMC Growth

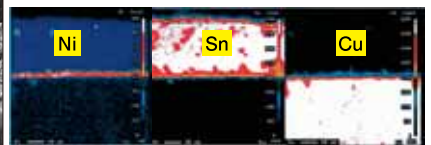
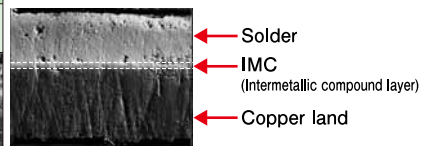
■ High Temperature Aging Test

[Test conditions] Soldering : 255°C, 4sec.  
High temperature storage: 120°C

|        |          | Magnified Cross-Section |                |
|--------|----------|-------------------------|----------------|
| Solder | Time (h) | SN100C                  | Sn-3.0Ag-0.5Cu |
| 0      | 0        |                         |                |
|        | 768      |                         |                |

SN100CL forms a stable intermetallic compound layer (Cu,Ni)<sub>6</sub>Sn<sub>5</sub> at the solder copper interface.

The Ni in SN100C stabilizes the intermetallic so that growth is slowed even at elevated temperatures.

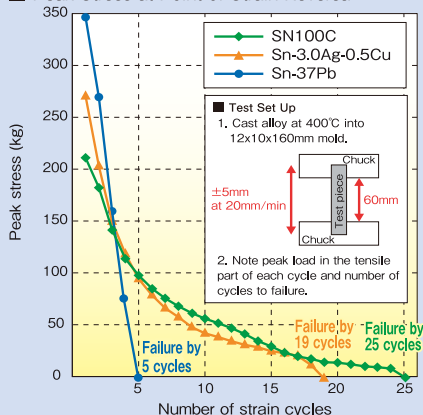


#### High Cyclic Strain Performance

Because of its ability to accommodate strain arising from CTE differences less stress is imposed on components.

##### Cyclic Strain Test

■ Peak Stress at Point of Strain Reversal



#### Excellent Resistance to Thermal Fatigue

-45°C 15mins dwell / +125°C 25mins dwell  
○ : Area where any changes was found.

| Solder alloy   | as soldered (chip size : 3216) |               | 2000 cycle    | 3000 cycle    | 4000 cycle    |
|----------------|--------------------------------|---------------|---------------|---------------|---------------|
|                | Appearance                     | Cross section | Cross section | Cross section | Cross section |
| SN100C         |                                |               |               |               |               |
| Sn-3.8Ag-0.7Cu |                                |               |               |               |               |

# SN100C<sup>®</sup> Series

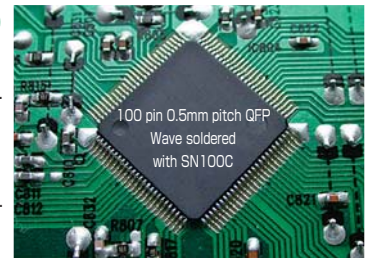
## High Reliability Lead-Free Solder



### for Wave Soldering SN100C(Sn-Cu-Ni+Ge)

SN100C is being used in thousands of wave soldering machines around the world and has proved its reliability in products exposed to the most severe service environments.

SN100C enables bridge-free wave soldering.



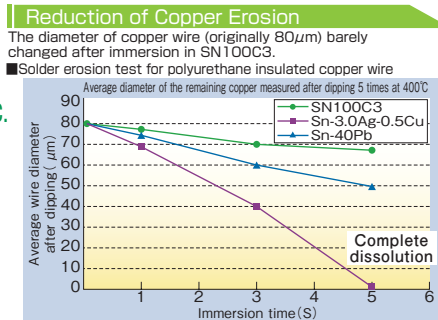
#### Features

- The trace addition of Ni means fewer shorts and no shrinkage defects.
- Ni-stabilized intermetallic layer inhibits copper erosion.
- Reliable in harsh environments.
- High ductility ensure long service life of joints subjected to cyclic strain.
- SN100C is formulated for minimal generation of dross.

#### High Temperature Dipping and Tinning Solder

### SN100C3-SN100C4

High temperature dip soldering and tinning of copper wire, polyurethane coated wire and component terminations. For use at temperature up to 400°C.



#### Features

- SN100C3 and SN100C4 make it possible to carry out dip soldering and tinning operations with minimum copper erosion.

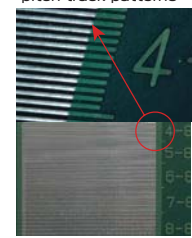
#### for Hot Air Solder Leveling (HASL)

### SN100CL(Sn-Cu-Ni+Ge)

Protects PCB solderability to ensure excellent wetting during soldering.

#### Excellent Fluidity

Good drainage ensures no bridges even on fine pitch track patterns



#### Features

- Excellent fluidity.
- Bridge-free coating of fine pitch circuitry.
- Bright smooth and uniform coating.
- Low copper erosion.
- Formation of stable intermetallic layer.

### High Reliability Lead-Free Solder Preforms SN100C(Sn-Cu-Ni+Ge)

Suitable for micro-soldering

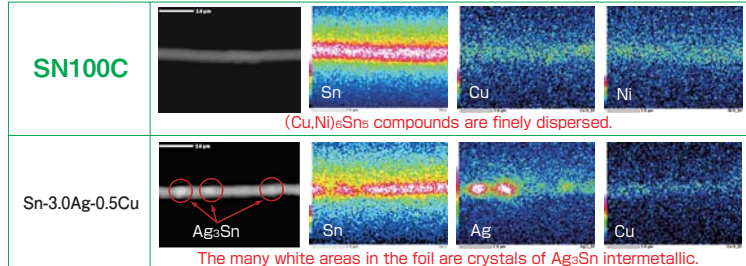
#### Features

- The finely dispersed microstructure of SN100C makes it possible to roll very thin foil without defects.

The eutectic behavior of SN100C (Sn-0.7Cu-0.05Ni+Ge) lead-free preforms means good melting characteristics during reflow. The superior properties of SN100C with low intermetallic growth provide high reliability and flexibility. Please contact us for more information on available sizes of ribbons and washers and alloy options.

#### Foil Microstructure

■ Solder Foil (1μm thickness) Element Mapping of Cross-sections



# eFlux

## Soldering Flux

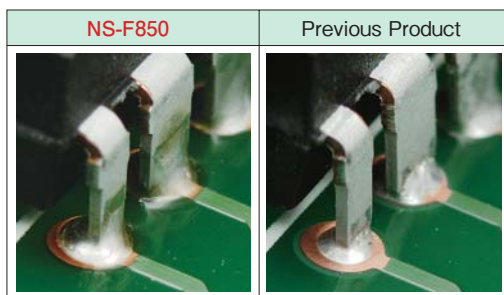
Soldering Flux



### Rosin Based Flux for Wave Soldering NS-F850

NS-F850 ensures excellent wetting of all PCB and component substrates to deliver maximum through hole fill and facilitates the solder drainage that ensures minimum bridges and icicles. It is the ideal flux for lead-free wave soldering.

#### Excellent Through-Hole Filling for Maximum Reliability



**[Test Conditions]**  
Wave Soldering  
• Conveyor Speed: 1.0m/min.  
• Solder Temperature: 255°C  
• Contact Time: 6sec.

### Completely Halogen-Free Flux NS-F900

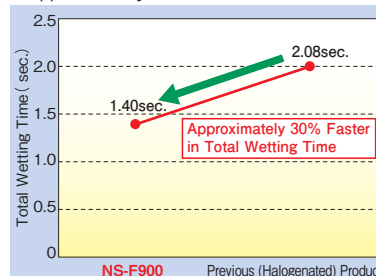


NS-F900 is a robust halogen-free flux that ensures excellent wetting even on oxidized copper.

NS-F900 is completely halogen-free containing no halogens (F, Cl, Br or I) for high reliability wave soldering.

#### Excellent Wetting (even on oxidized copper)

■ Approximately 30% Faster in Total Wetting Time



#### [Test Conditions]

- Wetting Balance Test
- Test Pieces: Oxidized Cu wire 0.6mm diameter
  - Alloy: SN100C
  - Solder Temperature: 255°C
  - Immersion Speed: 2mm/sec.
  - Immersion Depth: 1mm
  - Immersion Time: 15sec.
  - Withdrawal Speed: 2mm/sec.

# ePaste Solder Paste

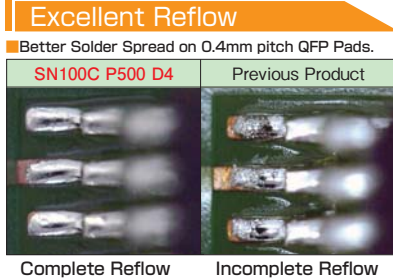
Lead-Free Solder Paste



## General Purpose SN100C P500 D4 (Sn-Cu-Ni+Ge)

In most cases SN100C can be reflowed with a profile similar to that used with SAC alloys

SN100C P500 D4 is a general purpose solder paste suitable for fine pitch applications.

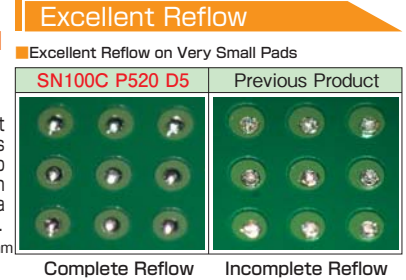


## For 01005 (0402 metric) Chip Components : SN100C P520 D5 (Sn-Cu-Ni+Ge)

High reliability lead-free solder paste optimized to deliver good reflow with chip components down to 0402 metric.

SN100C P520 D5 improves the joint quality of densely populated boards with filletless, small solder volume chip components and fine pitch mounting in which a reduction in joint strength is a concern due to the very small joint size.

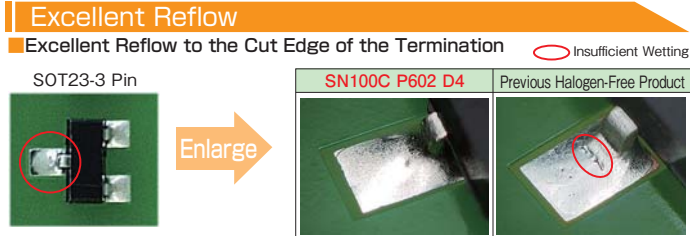
Pad dia. : 0.15mm



## Completely Halogen-Free SN100C P602 D4 (Sn-Cu-Ni+Ge)

Highly Activated Halogen-Free Solder Paste. No whisker observed after 1000 hours exposure to 85°C/85% RH.

SN100C (Sn-0.7Cu-0.05Ni+Ge) lead-free solder paste which does not contain halogens (F, Cl, Br, or I).



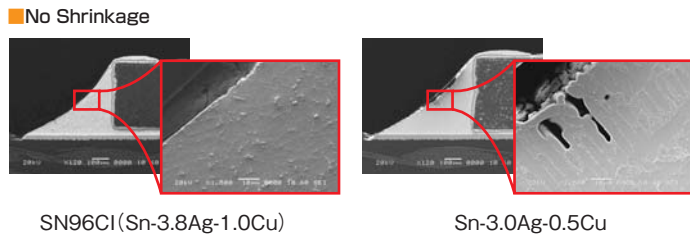
## SN96CI PF-33 FMQ (Sn-Ag-Cu)

Sn-Ag-Cu eutectic lead-free solder for reflow soldering

### Features

- Stable Cu<sub>6</sub>Sn<sub>5</sub> intermetallic compound.
- Formation of large plates of Ag<sub>3</sub>Sn suppressed in favor of uniform dispersion of fine crystals.
- Bright smooth fillets.
- Low incidence of shrinkage defects.

### Reduced Incidence of Shrinkage Defects



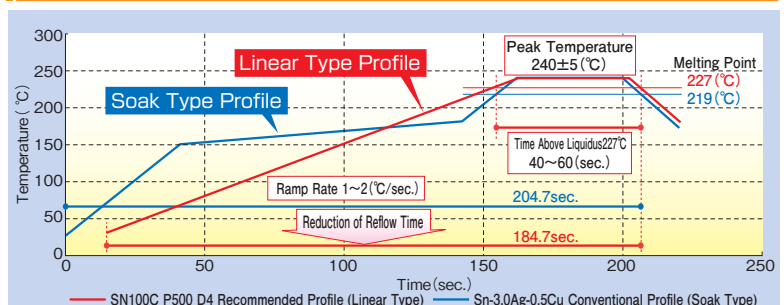
## Linear Type Reflow Profile

Lead-Free Solder Paste "SN100C series" and linear profile enables reflow with a profile similar to that is commonly used with SAC305 with 240 °C peak even though the 227°C melting point of SN100C is 8°C higher.

### Features

- Reduction of Hot Slump.
- Fast Melting Speed.
- Excellent Wetting Force.
- Reduction of Reflow Time by about 10%.

## Recommended Thermal Profile



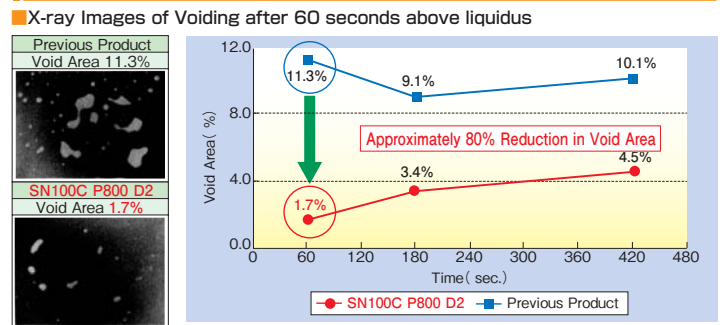
Note: The optimum reflow profile varies with the thermal mass of the components and PCB and the characteristics of the reflow oven. Please ensure that the reflow profile is optimized for each assembly.

## For Power Semiconductors : SN100C P800 D2 (Sn-Cu-Ni+Ge)

SN100C (SnCuNi+Ge) P800 D2 is a high reliability paste for device assembly that reduces voiding and reflow time.

Excellent wetting on nickel and high speed printability even with large apertures.

### Reduced Voiding Even with Short Reflow Time

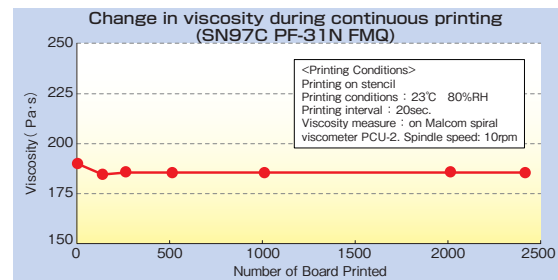


## SN97C PF-31N FMQ (Sn-Ag-Cu)

Good printability and stability of viscosity maintained during continuous printing.

### Stability of Viscosity

Good printability maintained during continuous printing of 2400 boards.



# eBall Solder Spheres

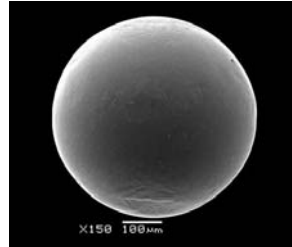
Lead-Free Solder Ball



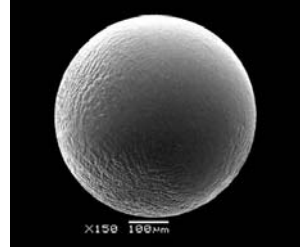
## Impact Resistant Solder Spheres SN100C(Sn-Cu-Ni+Ge)

High reliability solder spheres with excellent impact strength.

Suitable for BGA, CSP, MCM and high density fine pitch applications.



SN100C



Sn-3.0Ag-0.5Cu

SN100C spheres have a smooth surface free of shrinkage effects.

### Features

- High ductility ensures high impact strength.
- Stable intermetallic compound.
- Slow growth of interfacial intermetallic.

## High Energy Absorption at High Shear Speeds Means High Impact Strength

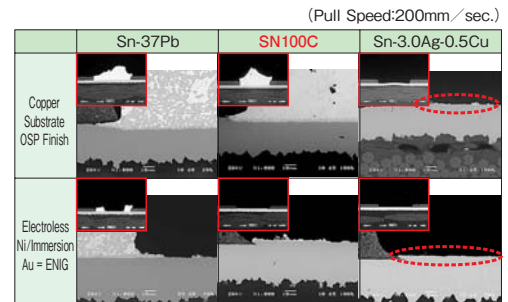
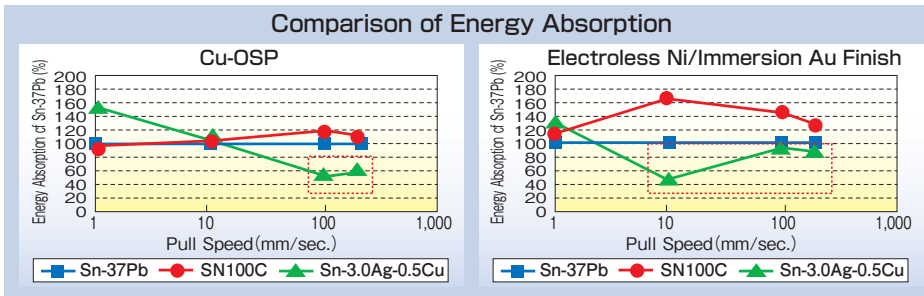
### Pull Test(Elongation Characteristics)

[Result] Relative Energy Absorption at Pull Speeds : **SN100C** ≥ Sn-37Pb > Sn-3.0Ag-0.5Cu (Sn-37Pb=100%)

Energy Absorption of Sn-3.0Ag-0.5Cu decreases steeply with pull speeds >10mm/sec.

In this area the Sn-3.0Ag-0.5Cu has a lower energy absorption than Sn-37Pb

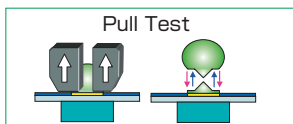
This is the area where interfacial fracture has occurred.



### Stress-Strain Curve (Energy Absorbed is Area Under Curve)

### Slow IMC Growth at Elevated Temperatures

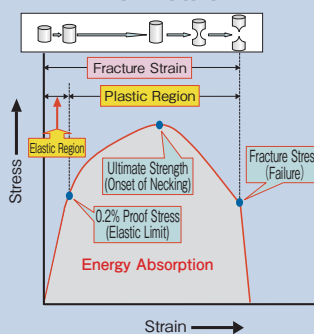
#### Impact Test Method



#### [Test Conditions]

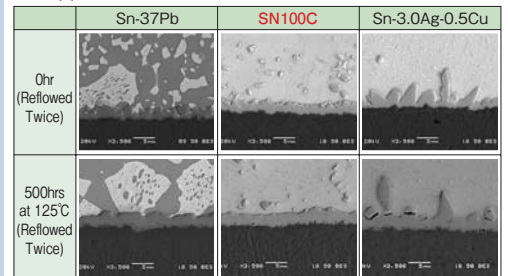
1. Test Equipment  
Dage 4000HS high speed bond tester
2. Substrate  
Solder Mask Defined Pad,  
Diameter : 0.42mm
3. Solder Sphere Diameter: 0.5mm

#### Typical Stress-Strain Curve for Metals

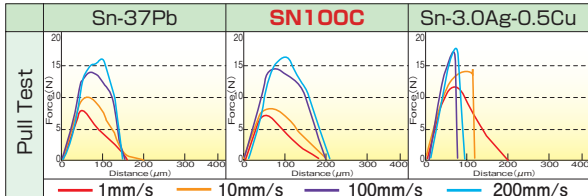


#### [Cross-Sections of Solder Spheres after Aging]

#### ■ Copper Substrate-OSP Finish



#### Result Cu Substrate With OSP Finish



#### [Board Assembly Conditions]

40 sec. above 220°C/ Peak Temperature 240°C

## Sphere Diameters Available

### Particle Size

0.1 ~ 0.25 mm(Standard Tolerance ±5μm)

0.3 ~ 0.45 mm(Standard Tolerance ±10μm)

0.5 ~ 0.76 mm(Standard Tolerance ±20μm)  
(±10μm available)

※Contact us about unlisted products, size, and tolerances

## For Best Soldering Use the Compatible Flux RM-5

### ■ Properties

| Item                                 | RM-5                    |
|--------------------------------------|-------------------------|
| Halide Content (mass%)               | 0.02                    |
| *Spread Factor (%)                   | ≥75                     |
| Insulation Resistance (Ω) after 96hr | ≥1.0 x 10 <sup>11</sup> |
| Electromigration (Ω) after 96hr      | ≥1.0 x 10 <sup>11</sup> |
| Application                          | Stencil printing        |



RM-5

\*Solder used for spread factor measurement: SN100C



## Less Tip Carbonizing SN100C(030) (Sn-Cu-Ni+Ge)

The flux-cored solder wire enables fast soldering with less carbonizing of soldering tip and less flux spatter providing greater productivity than existing products.

### Less Tip and Pad Carbonizing

#### Tip carbonizing test

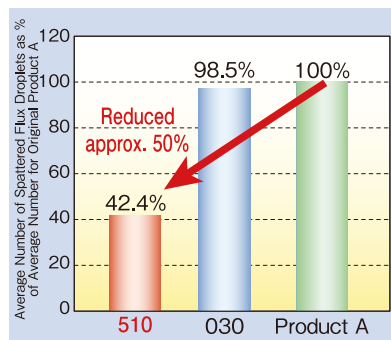
| Carbonizing conditions |      | [Conditions] 380°C |       |       |        | Time of start of carbonizing |
|------------------------|------|--------------------|-------|-------|--------|------------------------------|
| Product code           | Time | 0sec.              | 2sec. | 4sec. | 15sec. |                              |
| 030                    |      |                    |       |       |        | 13sec.                       |
| Product A              |      |                    |       |       |        | 3sec.                        |
| Product B              |      |                    |       |       |        | 2sec.                        |

## Low-Spatter SN100C(510) (Sn-Cu-Ni+Ge)

This high reliability flux-cored solder wire generates very little spatter even with the high solder tip temperatures required to burn off polyurethane insulating enamel. Reduced erosion means a tip life more than twice that with Product A.

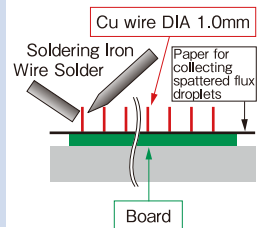
### Less Flux Spattering

#### Spattering Rating (Average) 280°C~480°C



#### [Test Method]

Insert 10 lengths of 1mm diameter copper wire into test board. Place paper for collecting spattered flux droplets over the wire. Solder each wire with a tip temperature of 280°C~480°C. Count the number of spattered flux droplets around each soldered wire.



## Completely Halogen-Free SN100C(040) (Sn-Cu-Ni+Ge)

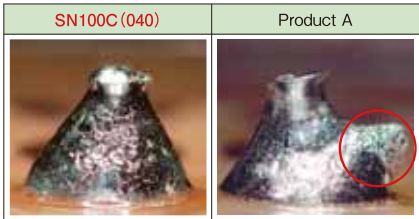


High reliability SN100C (Sn-0.7Cu-0.05Ni+Ge) lead-free solder wire does not contain F, Cl, Br or I. Good separation of the solder from the tip with consequent reduced incidence of icicles. No whiskers observed after exposure to 85°C/85%RH for 1000 hours.

### Good Separation of the Solder from Tip

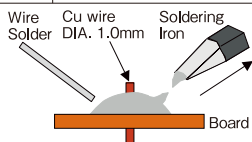
#### Solder Appearance Directly after Tip Separation

Reduction of Icicles [Conditions] 380°C



#### [Test Method]

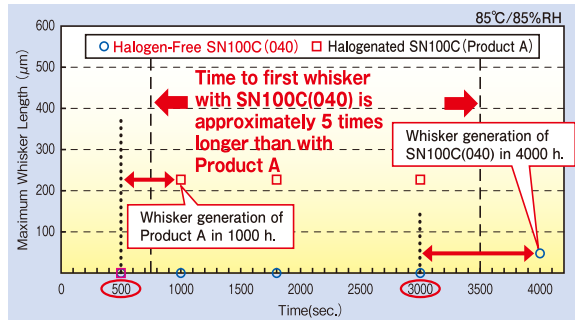
Wait 2 seconds after soldering and evaluate for the presence of icicles.



### Less Generation of Whisker by Solder Corrosion

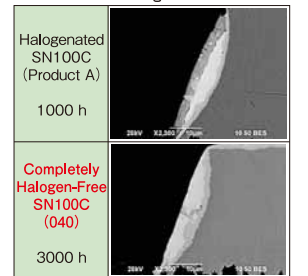
#### Effect of Environment on Time to First Whisker (in Flux Residue)

No whisker growth on joints made with completely halogen-free lead-free flux-cored wire SN100C(040) during exposure to 1000 hours of 85°C/85% RH.



#### Effect of Flux Type on the Extent of Corrosion

Manual Soldering (85°C/85%RH Side of Trace) Corrosion of Halogen-Free at 3000h is less than with Halogenated at 1000h.



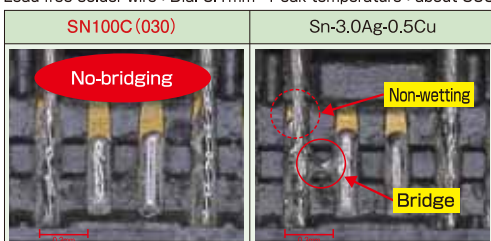
## Ultrafine Diameter SN100C(030) (Sn-Cu-Ni+Ge)

SN100C(030) flux-cored solder wire can contribute to improved reliability for micro-joints. Good spread and good pull-back results in fewer bridges.

### Less Bridging

#### Extra Fine Coaxial Harnessing in Cell Phones (example of application)

Lead-free solder wire : Dia. 0.1mm Peak temperature : about 300°C (Electrical Resistance Soldering)

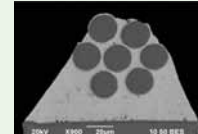


#### Soldering of Extra Fine Coaxial Harnessing

Ultra fine coaxial connector wire  
0.3mm pitch 40-pin connector  
Terminations : Phosphor bronze with  
Electroless Ni+ Immersion Au finish



Ultra fine coaxial cable  
7 strands tin plated copper wire 25µm diameter  
(Cross-section of Connection Cable)



# Lead-Free Solder Products List

## Solder Paste

### ■Printing Grade Solder Pastes

| Alloy code | Flux code | Product code     | Flux category <sup>1)</sup> | Halogens <sup>2)</sup> | Particle size <sup>3)</sup><br>( $\mu\text{m}$ ) | Viscosity <sup>4)</sup><br>(Pa·s) | SIR <sup>5)</sup><br>( $\Omega$ ) | Recommended Use · Features   |
|------------|-----------|------------------|-----------------------------|------------------------|--|-----------------------------------|-----------------------------------|--|
| SN100C     | P500      | SN100C P500 D4   | ROLO                        | Present                | 20~38<br>Equivalent to TYPE4                     | 200                               | $\geq 1.0 \times 10^9$            | General purpose.   |
| SN100C     | P520      | SN100C P520 D5   | ROLO                        | Present                | 10~25<br>Equivalent to TYPE5                     | 200                               | $\geq 1.0 \times 10^9$            | For 01005(0402metric) chip component.  |
| SN100C     | P602      | SN100C P602 D4   | ROLO                        | Absent                 | 20~38<br>Equivalent to TYPE4                     | 220                               | $\geq 1.0 \times 10^9$            | Completely halogen-free.<br>Does not promote corrosion-induced whisker growth. <sup>6)</sup> |
| SN100C     | P800      | SN100C P800 D2   | ROM1                        | Present                | 45~75<br>Equivalent to TYPE2                     | 200                               | $\geq 1.0 \times 10^9$            | For power semiconductors.<br>Approx. 80% reduction in void area.                             |
| SN96CI     | PF-33     | SN96CI PF-33 FMQ | ROLO                        | Present                | 25~45<br>Equivalent to TYPE3                     | 205                               | $\geq 1.0 \times 10^{10}$         | Less shrinkage.<br>Sn-Ag-Cu system alloy.  |
| SN97C      | PF-31N    | SN97C PF-31N FMQ | ROLO                        | Present                | 20~45<br>Equivalent to TYPE3                     | 190                               | $\geq 1.0 \times 10^{10}$         | Sn-Ag-Cu system alloy.   |
| SN97C      | PF-37     | SN97C PF-37 SFMQ | ROLO                        | Present                | 20~30<br>Equivalent to TYPE4                     | 190                               | $\geq 1.0 \times 10^{10}$         | Suitable for printing down to 0.23mm aperture.   |
| LF-C2      | PF-39     | LF-C2 PF-39 FMQ  | ROL1                        | Present                | 25~45<br>Equivalent to TYPE3                     | 185                               | $\geq 1.0 \times 10^{11}$         | Sn-Ag-Cu system alloy.   |
| SN96       | PF-36     | SN96 PF-36 AMQ   | ROL1                        | Present                | 25~53<br>No J-STD-005 equivalent                 | 190                               | $\geq 1.0 \times 10^9$            | Sn-Ag-Cu-Bi system alloy.  |
| 95A        | PF-35     | 95A PF-35 AMQ    | ROL1                        | Present                |  | 185                               | $\geq 1.0 \times 10^9$            | Sn-Ag system eutectic alloy  |
| BI57       | LRA-5     | BI57 LRA-5 AMQ   | ROL1                        | Present                |  | 150                               | $\geq 1.0 \times 10^{10}$         | Sn-Sb system alloy.<br>For Low temperature soldering.  |

### ■Dispensing Grade Solder Pastes

| Alloy Code | Flux Code | Product Code       | Flux Category <sup>1)</sup> | Halogens <sup>2)</sup> | Particle Size <sup>3)</sup><br>( $\mu\text{m}$ )                 | Viscosity <sup>4)</sup><br>(Pa·s) | SIR <sup>5)</sup><br>( $\Omega$ ) | Recommended Use · Features                        |
|------------|-----------|--------------------|-----------------------------|------------------------|--|-----------------------------------|-----------------------------------|---|
| SN100C     | RMA H-1   | SN100C RMA FDQ H-1 | ROL1                        | Present                | 25~45<br>Equivalent to TYPE3<br>20~40<br>No J-STD-005 equivalent | 300~700                           | $\geq 1.0 \times 10^9$            | Stable dispensing.<br>Suitable for rapid heating. |
| SN96CI     |           | SN96CI RMA FDQ H-1 |                             |                        |  |                                   |                                   |   |
| SN97C      |           | SN97C RMA FDQ H-1  |                             |                        |  |                                   |                                   |   |
| SN96       |           | SN96 RMA FDQ H-1   |                             |                        |  |                                   |                                   |   |

## Flux-Cored Solder Wire

| Alloy Code | Flux Code | Product Code | Flux Category <sup>1)</sup> | Halogens <sup>2)</sup> | SIR <sup>5)</sup><br>( $\Omega$ ) | Spread Factor <sup>7)</sup><br>(%) | Recommended Use · Features   |
|------------|-----------|--------------|-----------------------------|------------------------|-----------------------------------|------------------------------------|--|
| SN100C     | 030       | SN100C(030)  | ROLO                        | Present                | $\geq 1.0 \times 10^9$            | $\geq 80$                          | Less Tip and pad carbonizing.  |
| SN100C     | 040       | SN100C(040)  | ROLO                        | Absent                 | $\geq 1.0 \times 10^9$            | $\geq 75$                          | Completely halogen-free.<br>Does not promote corrosion-induced whisker growth. <sup>6)</sup> |
| SN100C     | 510       | SN100C(510)  | ROLO                        | Present                | $\geq 1.0 \times 10^9$            | $\geq 75$                          | Low flux spattering.   |
| SN100C     | 010       | SN100C(010)  | ROL1                        | Present                | $\geq 1.0 \times 10^{10}$         | $\geq 75$                          | High productivity. Minimal copper erosion.<br>Sn-Cu-Ni+Ge system alloy.                      |
| SN96CI     | 010       | SN96CI(010)  | ROL1                        | Present                | $\geq 1.0 \times 10^{10}$         | $\geq 75$                          | High productivity. Minimal copper erosion.<br>Sn-Ag-Cu system alloy.                         |
| SN97C      | 010       | SN97C(010)   | ROL1                        | Present                | $\geq 1.0 \times 10^{10}$         | $\geq 75$                          | High productivity.<br>Sn-Ag-Cu system alloy.   |

## Soldering Flux

### ■Rosin Based Flux

| Product Code | Flux Category <sup>1)</sup> | Halogens <sup>2)</sup> | Halide Content<br>(mass%) | SG<br>(20°C) | Solid Content<br>(mass%) | SIR <sup>5)</sup><br>( $\Omega$ ) | Recommended Use · Features   |
|--------------|-----------------------------|------------------------|---------------------------|--------------|--------------------------|-----------------------------------|--|
| NS-F850      | ROL1                        | Present                | 0.09                      | 0.826        | 16                       | $\geq 1.0 \times 10^9$            | Excellent wetting and through-hole fill.                                 |
| NS-F900      | ROLO                        | Absent                 | 0                         | 0.824        | 15                       | $\geq 1.0 \times 10^{10}$         | Completely halogen-free.<br>Excellent wetting (even on oxidized copper). |

### ■Other Fluxes

| Activity              | Product Code | Classification           | Recommended Substrate      | Recommended Application                                      | Halogens <sup>2)</sup> | Special Diluents | Soldering Method                        | Additional Information   |
|-----------------------|--------------|--------------------------|----------------------------|--|------------------------|------------------|---|--|
| Low<br>↑<br>↓<br>High | NS-316 F-8   | Plastic Type             | Copper                     | Printed circuit board assembly,<br>Cable harness termination | Absent                 | NS-770           | Single wave soldering,<br>Dip soldering | ●Low Residue No-Clean Flux.<br>●Please be sure to control the concentration of the flux.<br>[This is not necessary in the case of a spray-type flux.]<br>●There is also an extra active D.S.type available.(NS-30,NS-52)<br>●Use only purified water for dilution.<br>●It is necessary to remove flux residues by washing in warm or room temperature water.<br>●NS-65: Does not contain zinc chloride so suitable for use in electrical and electronics assembly.<br>●Use only purified water for dilution.<br>●It is necessary to remove flux residues by washing in warm or room temperature water. |
|                       | NS-316 F-7   | Low Residue              |                            | Hot-dip tinning of lead frames                               |                        | NS-700           |   |  |
|                       | NS-334       | Low Residue Organic Acid |                            | Hot-dip tinning of lead frames,<br>Cable harness termination |                        | NS-700           |   |  |
|                       | NS-30        | Organic Acid             | Alloy 42                   | Hot-dip tinning of lead frames                               | Present                | Water            | Dip Soldering                           |  |
|                       | NS-52        | Water Soluble            |                            | Hot-dip tinning of lead frames                               | Absent                 | Water            |   |  |
|                       | NS-45        | Inorganic Acid           | Nickel                     | Radiator, Plate  | Present                | Water            |   |  |
|                       | NS-72        |                          |                            |  | Present                | Water            |   |  |
|                       | NS-22        |                          |                            |  | Present                | Water            |   |  |
|                       | NS-23        | Water Soluble            | Stainless steel(except Al) | Joining stainless steel                                      | Present                | Water            |   |  |
|                       | NS-65        | Ferrous alloys           | Radiator, Plate            | Radiator, Plate  | Present                | Water            |   |  |

1) Flux Category (Activity Level) : ANSI/IPC J-STD-004

2) Halogens : F, Cl, Br, and I.

3) Particle Size : ANSI/IPC J-STD-005

4) Viscosity (for Printing) : Measured by Malcom spiral viscometer at 10rpm, 25°C. Reading taken when the value stabilizes after 3 - 5 minutes.

4) Viscosity (for Dispensing) : Measured by Brookfield R.V.T viscometer. Test temperature 25°C. Measurement taken 2 minutes after spindle entry to paste surface. 5rpm.

5) Electrical Resistance : Test conditions 85°C 85%RH 168hr

(Surface Insulation Resistance)

6) Does not promote corrosion-induced whisker growth. : Whiskers after 1000 hours at 85°C/85%RH

7) Spread Factor : Melt coiled SN100C solder on oxidized Cu plate for 5 seconds.



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(Note)

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All the statements, technical information and recommendations contained herein are based on the data or other information available to us that we believe to be reliable but the accuracy and completeness of which we can not guarantee. Descriptions including specification are subject to change without prior notification.

Product MSDS must be reviewed for proper use, handling, and disposal before use.

Completely halogen-free means that it does not contain F, Cl, Br, or I.

SN100C® is patented in 23 countries and regions including Japan (JPN PAT. No. 3152945) and United States (US PAT No. 6180055).

# SN100C



# NS<sup>e</sup>

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